REMARKS

1. Preliminary Remarks

a. Status of the Claims

Claims 1-36 are pending and under active consideration in this application. Claims 1, 7, 10, 12, 14, 15, 17, 19, 27, 28, and 36 are amended; and claims 4-6, 8, 9, 11, and 13 are hereby canceled. Applicant respectfully requests entry of the amendments and remarks made herein into the file history of the application. Upon entry of the amendments, claims 1-3, 7, 10, 12, and 14-36 will be pending and under active consideration.

b. Amendments to the Claims

Amended claim 1 includes the limitations of claims 4-6, 8, 9, 11, and 13 and finds support in these claims as originally filed. Claims 1 and 15 are amended to correct typographical errors in the terms "uranium" and "Group II," respectively. Claim 7 is amended to modify "comprises" by stating "additionally comprises." Support for this amendment is found at page 5, lines 1-3 of the specification as originally filed. Claims 10, 12, 14, 17, and 36 are amended to depend from claim 1. Claims 19 and 31 are amended to depend from claim 18 to have appropriate antecedent basis for the term "container."

Although acknowledged by the Examiner as two separate claims, claim 27 is amended to remove the text of claim 28, which appeared in previous claim 27 because of a typographical error in omitting a carriage return. Claim 28 is amended to indicate its text is now properly indicated on a line separate from claim 27. Accordingly, Applicant submits that the scope of amended claim 28 is identical to that of previous claim 28, except that amended claim 28 now depends from claim 1. In view of the foregoing, Applicant hereby states that the claim amendments do not add any new matter.

c. Claim Objections

At page 2 of the Office Action, the Examiner objects to claim 1 for including a misspelling of "uranium." Amended claim 1 corrects this typographical error, thereby obviating this objection.

The Examiner also objects to claim 15 for incorrectly referring to "Group H" of the Periodic Table. Amended claim 15 corrects this typographical error, thereby obviating this rejection. In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw the claim objections.

2. Patentability Remarks

a. 35 U.S.C. § 112, second paragraph

On pages 2 and 3 of the Office Action, the Examiner rejects 19-35 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. The Examiner specifically asserts that the limitation "said at least one superplasticiser" in claim 19 lacks sufficient antecedent basis, and that dependent claim 20 further elaborates on this limitation. The Examiner also asserts that claims 21-35 lack proper antecedent basis for the limitation "the container." Amended claim 19 now depends from claim 18, which relates to "addition of at least one superplasticiser," and thus has proper antecedent basis, as now does claim 20.

With regard to the rejection of claims 21-35 and the term "container," Applicant believes that the rejection is actually directed to claims **28**-35 since the term "container" does not appear in claims 21-27. Independent claim 28 is directed in part to the method of claim 1, wherein the uranium metal is placed in an appropriate container and a cementitious material is added and allowed to at least partially cure. This claim provides proper antecedent basis for the term "container" for dependent claims 29 and 30. With regard to providing antecedent basis for claims 31-35, claim 31 is amended in part to be directed to the method of claim 18, thereby providing antecedent basis for the term "container." Claims 32-35 depend from claim 31 and now have proper antecedent basis for "container." In view of the foregoing amendments and remarks, Applicant respectfully requests that the Examiner reconsider and withdraw the claim rejections under 35 U.S.C. § 112, second paragraph.

b. 35 U.S.C. § 102

On pages 3-5 of the Office Action, the Examiner rejects claims 1-8, 18-22-25, 28, 29, 31 and 36 under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 5,545,796 ("Roy" hereafter). Applicant disagrees. Nevertheless, amended claim 1 includes the limitations of claims 4, 5, 6, 8, 9, 11, and 13. The instantly claimed subject matter relates to encapsulating uranium metal in a way that **minimizes corrosion of the metal** by encapsulating it in a cementitious material that **includes a source of oxygen** within the cement matrix. Oxygen is provided by (a) incorporating at least one anionic or non-ionic surfactant as air entraining agents or cenospheres to facilitate enhanced atmospheric oxygen access; or (b) by including at least one peroxide as an independent source of oxygen.

In stark contrast, Roy relates to a method of containing a radioactive material by making a containment system using radioactive metal components, as well as a cement, but **in no way relates**

to minimizing the corrosion of uranium metal that is contained in the containment system. Accordingly, Roy makes no mention whatsoever of providing a source of oxygen within the containment system in the manner required in amended claim 1 to minimize corrosion. The Examiner contends that Roy teaches minimizing uranium metal corrosion by "[limiting] the amount of water used in the concrete mixture, supplementing the need for workability with plasticizer materials." Applicant submits that the Examiner has misconstrued what Roy teaches. Roy's limit on the amount of water has **nothing to do with minimizing uranium metal corrosion**, but rather specifically relates to **generating a desirable consistency of the cement mixture**. Roy at column 14, lines 61-63 ("Use of minimal water provides a desirable, relatively dry consistency cement mixture"). At no point does Roy teach anything about minimizing uranium metal corrosion and its relation to either water or oxygen.

As further evidence of the Examiner's erroneous inference that water is limited by Roy to minimize corrosion, Applicant notes that the containment system of Roy has a maximum weight-ratio content of water of 1:9.[1] *See* Roy at column 14, lines 2-6. In contrast, the instant specification teaches that water content can be as high as 50%. *See* Instant Specification at page 7, lines 5-7. Thus, if water were corrosive, Applicant's invention would not prevent corrosion. Rather than being based on minimizing water content to inhibit metal corrosion, the instantly claimed subject matter is based on including an oxygen source within the cement matrix.

Accordingly, Roy does not teach or suggest all of the limitations of the instant claims. Applicant infers that the Examiner acknowledges this since amended claim 1 includes the limitations of claims 9, 11, and 13, and the Examiner does not reject these claims under 35 U.S.C. § 102. In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 1-8, 18-22-25, 28, 29, 31 and 36 under 35 U.S.C. § 102.

c. 35 U.S.C. § 103

(1) Claims 4, 6, and 13-16 in view of Roy and Newton

On pages 6 and 7, the Examiner rejects claims 4, 6, and 13-16 under 35 U.S.C. § 103(a) as allegedly being obvious over Roy in view of U.S. Patent No. 5,700,107 ("Newton" hereafter). The Examiner asserts that Newton teaches a method of remediating soil contaminated with inorganic

[1] Specifically, Roy discloses that the cement matrix should consist of approximate weight ratios of (aggregate):(sand):(cement):(water) of (10):(5 to 7):(3 to 4):(1 to 2). Based on this formulation, the highest amount of water that could be used in the matrix is 2 parts, as compared to the sum of 10, 5, and 3 (the lowest amounts of the other components), or 18. Thus, the most water that the Roy matrix can contain is a weight ratio of 1:9.

and organic pollutants by treating the soil with a complexing agent capable of chelating the pollutants and a matrix-generating agent that includes a cement and other additives, examples of which include an oxidizing agent such as certain peroxides. The Examiner concludes that one of ordinary skill in the art would have been motivated to include the peroxide oxygen source of Newton in the method of Roy, because they act as oxidizing agents to assist in oxidizing the pollutants. Applicant respectfully disagrees.

The basis for the Examiner's rejection is that there was some teaching, suggestion, or motivation of the prior art that would have led one of ordinary skill to combine Roy with Newton to arrive at the claimed invention. *See* MPEP § 2143.G. Under this reasoning, the claimed invention is obvious only if (a) there was some teaching, suggestion, or motivation, either in the cited references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the cited references; and (b) there was reasonable expectation of success. Applicant submits that one of ordinary skill in the art had no motivation whatsoever to combine the teachings of Roy and Newton.

As discussed above, the instantly claimed subject matter relates to a method for encapsulating uranium metal that minimizes corrosion of the metal, while Roy does not even address this point. Similarly, Newton relates to remediating soil that is contaminated with various inorganic and organic pollutants, and does not relate to encapsulating uranium metal. Accordingly, Applicant submits that one of skill would not have been motivated to adopt the teaching of Newton into the teaching of Roy.

In fact, Newton teaches away from the instantly claimed subject matter. The matrix of Newton "has a plurality of catalytically active reactive sites that are created by the incorporation of the metal oxides into the matrix. The local acidity of these sites is very high, greater than that of sulphuric acid." Newton at column 3, lines 25-28. One of ordinary skill in the art would appreciate that such conditions would be disastrous when attempting to encapsulate uranium metal, and would lead to the very corrosion that the instantly claimed subject matter is intended to avoid. Accordingly, Newton would be of no value to one of ordinary skill in the art in the context of minimizing corrosion of an encapsulated uranium metal. Therefore, Applicant submits that it would not have been obvious to arrive at the instantly claimed subject matter from the teachings of Roy and Newton. In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 4, 6, and 13-16 under 35 U.S.C. § 103(a) over Roy in view of Newton.

(2) Claims 9 and 10 over Roy in view of Newton, and in further view of Bustard

At pages 7 and 8 of the Office Action, the Examiner rejects claims 9 and 10 under 35 U.S.C. § 103(a) as allegedly being obvious over Roy in view of Newton and in further view of U.S. Patent No. 4,230,597 ("Bustard" hereafter). The Examiner asserts that Bustard teaches a way of converting radioactive waste materials into solid form in which a nonionic, cationic or anion surfactant is provided as a defoaming material. The Examiner reasons that it was known that radioactive waste materials tend to foam when an acid-curing agent is added, and that the surfactant works as a defoaming agent that reduces interfacial tension between the two liquids or between a liquid solid mixture. The Examiner concludes that one of skill in the art would have been motivated to provide a surfactant like those taught by Bustard as a defoaming agent in the radioactive metal encapsulation process. Applicant respectfully disagrees.

The basis for the Examiner's rejection is that there was some teaching, suggestion, or motivation of the prior art that would have led one of ordinary skill to combine Roy with Newton and Bustard to arrive at the claimed invention. *See* MPEP § 2143.G. Under this reasoning, the claimed invention is obvious only if (a) there was some teaching, suggestion, or motivation, either in the cited references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the cited references; and (b) there was reasonable expectation of success. Applicant submits that one of ordinary skill in the art had no motivation whatsoever to combine the teachings of Roy, Newton, and Bustard.

Bustard discloses that radioactive waste materials are converted into solid form by mixing them with a polymeric formulation that solidifies and entraps the waste. The polymeric formulation includes urea-formaldehyde, methylated urea-formaldehyde, urea, a plasticiser, and optionally a defoaming agent that can be an anionic or non-ionic surfactant. The waste is mixed with the formulation, and then treated with an acidic catalyst such as sulfuric acid, and passed to a disposable container in which the formulation solidifies and entraps the radioactive waste, which can subsequently be safely and effectively disposed of or stored. In contrast, as discussed above, the instantly claimed subject matter relates to a method of encapsulating uranium metal that minimizes corrosion of the metal. In those circumstances, Applicant submits that one of ordinary skill would have no motivation to select a defoaming agent that is used in a polymeric encapsulation formulation that includes urea-formaldehyde, methylated urea-formaldehyde, urea, and a plasticiser in order to minimize corrosion within a cement matrix by facilitating enhanced atmospheric oxygen

access within the matrix. Accordingly, it would not have been obvious to arrive at the instantly claimed subject matter. In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claim 9 and 10 under 35 U.S.C. § 103(a) over Roy in view of Newton and Bustard.

(3) Claims 11 and 12 over Roy in view of Newton, and in further view of Datta

On pages 8-10 of the Office Action, the Examiner rejects claims 11 and 12 under 35 U.S.C. § 103(a) as allegedly being obvious over Roy in view of Newton, and in further view of U.S. Patent Publication No. 2004/0079260. The Examiner asserts that Datta discloses producing synthetic cenosphere-like microspheres that are substantially chemically inert and thus a suitable replacement for natural cenospheres. The Examiner infers that the microsphere and cenospheres would have similar characteristics and uses. The Examiner asserts that the microspheres can be used as fillers in inorganic cementitious materials or concrete systems. The Examiner concludes that one of ordinary skill in the art would have been motivated to include cenospheres in the cement material of Roy because filler materials are commonly used to impart properties of weight reduction, improved processing, performance enhancement, improved machinability and/or improved workability to the cement material. Applicant respectfully disagrees.

The basis for the Examiner's rejection is that there was some teaching, suggestion, or motivation of the prior art that would have led one of ordinary skill to combine Roy with Newton and Datta to arrive at the claimed invention. *See* MPEP § 2143.G. Under this reasoning, the claimed invention is obvious only if (a) there was some teaching, suggestion, or motivation, either in the cited references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the cited references; and (b) there was reasonable expectation of success. Applicant submits that one of ordinary skill in the art had no motivation whatsoever to combine the teachings of Roy, Newton, and Datta.

As discussed above, Applicant submits that Roy in no way relates to encapsulating uranium metal in a cement matrix in a way that minimizes corrosion of the metal. Applicant further submits that Datta is similarly deficient. Datta at no stage makes reference to the encapsulation of uranium metal, let alone considers how this might be done in such a way as to allow for minimizing corrosion of the metal. Indeed, this reference provides no guidance whatsoever to one of ordinary skill seeking to provide a source of oxygen within a cement matrix by facilitating enhanced atmospheric oxygen access. Thus, one of ordinary skill would have had no motivation to consider in some way attempting to combine the teachings of Datta with those of Roy in order to arrive at the instantly

claimed subject matter. Accordingly, Applicant submits that the claimed subject matter is not obvious over Roy, Newton, and Datta. In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 11 and 12 under 35 U.S.C. § 103(a) over Roy in view of Newton and Datta.

(4) Claims 21, 30, and 32-35 over Roy

On pages 10-12 of the Office Action, the Examiner rejects claims 21, 30, and 32-35 under 35 U.S.C. § 103(a) as allegedly being obvious over Roy. The Examiner asserts that the only differences between the subject matter of these claims and the teachings of Roy are that Roy fails to teach (a) the percentage of plasticizer added to the cementitious material; (b) a container that as a drum with a capacity in the region of 500 liters; and (c) the sequence of the process steps. In view of the subject matter of amended claim 1, and the dependence of claims 21, 30, and 32-35 on claim 1, Applicant respectfully disagrees.

The basis for the Examiner's rejection is that there was some teaching, suggestion, or motivation of the prior art that would have led one of ordinary skill to modify Roy to arrive at the claimed invention. *See* MPEP § 2143.G. Under this reasoning, the claimed invention is obvious only if (a) there was some teaching, suggestion, or motivation, either in the cited references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the cited references; and (b) there was reasonable expectation of success. Applicant submits that one of ordinary skill in the art had no motivation whatsoever to modify Roy to arrive at the claimed subject matter.

As discussed above, amended claim 1 includes the limitations of claims 4, 5, 6, 8, 9, 11, and 13. Accordingly, the instantly claimed subject matter relates to encapsulating uranium metal in a way that minimizes corrosion of the metal by encapsulating it in a cementitious material that includes a source of oxygen within the cement matrix. Oxygen is provided by (a) incorporating at least one anionic or non-ionic surfactant as air entraining agents or cenospheres to facilitate enhanced atmospheric oxygen access; or (b) by including at least one peroxide as an independent source of oxygen.

As additionally discussed above, Roy in no way relates to minimizing the corrosion of uranium metal that is contained in the containment system, and makes no mention whatsoever of providing a source of oxygen within the containment system in the manner required in amended claim 1. Furthermore, at no point does Roy teach anything about minimizing uranium metal corrosion. Roy does not address the same problem as the instantly claimed subject matter, let alone

propose or in any way suggest solutions to the problem that are provided by the instantly claimed subject matter. Thus, not only does Roy fail to teach or suggest all of the limitations of the claims, but more importantly, it fails to provide any motivation for one of ordinary skill in the art to modify its teachings to include an oxygen source within an encapsulating cement matrix. Because of this fundamental failure of Roy, this reference further does not provide any motivation to include in the cement matrix any kind of surfactant as an air entraining agent or cenospheres to facilitate enhanced oxygen access from the atmosphere into the matrix, or include at least one peroxide as an independent source of oxygen. Accordingly, Applicant submits that the instantly claimed subject matter is not obvious over Roy. In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 21, 30, and 32-35 under 35 U.S.C. § 103(a) over Roy.

(5) Claims 26 and 27 over Roy in view of Mallek

On page 12 of the Office Action, the Examiner rejects claims 26 and 27 under 35 U.S.C. § 103(a) as allegedly being obvious over Roy in view of U.S. Patent No. 4,652,404 ("Mallek" hereafter). The Examiner asserts that the only difference between the claimed subject matter and Roy is that Roy fails to disclose water content in the claimed ranges with regard to the cement composition. The Examiner further asserts that Mallek discloses a process for cementing waste materials, and that radioactive wastes are mixed with aqueous cement in a ratio of 0.3:1 water:cement. The Examiner concludes that one of ordinary skill in the art would have been motivated to provide an aqueous cement mixture in the ratios taught by Mallek for effecting the setting of the cement. Applicant respectfully disagrees.

The basis for the Examiner's rejection is that there was some teaching, suggestion, or motivation of the prior art that would have led one of ordinary skill to combine Roy with Mallek to arrive at the claimed invention. *See* MPEP § 2143.G. Under this reasoning, the claimed invention is obvious only if (a) there was some teaching, suggestion, or motivation, either in the cited references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the cited references; and (b) there was reasonable expectation of success. Applicant submits that one of ordinary skill in the art had no motivation whatsoever to combine the teachings of Roy and Mallek.

As discussed above, in view of amended claim 1, the instantly claimed subject matter differs significantly from the teachings of Roy, because Roy does not relate in any way to the problem of uranium metal corrosion when the metal is encapsulated in a cement matrix. Accordingly, Roy is fundamentally deficient in providing any motivation for one of skill to modify this reference or

combine it with any others to arrive at a method of encapsulating uranium metal in a way that minimizes corrosion of the metal. Mallek adds nothing of significance to the teachings of Roy in the context of the instantly claimed subject matter.

Moreover, based on Examiner's own reasoning, it would be illogical to combine the teachings of Mallek with Roy. As discussed above, the Examiner erroneously asserts that Roy teaches limiting the water content of its cement matrix in order to minimize corrosion. *See* Office Action at page 4, first paragraph. Instead, Roy actually teaches that the amount of water should be limited in order to arrive at a desirable, relatively dry consistency for the cement mixture. *See* Roy at column 14, lines 61-63. Moreover, as also discussed above, Roy teaches that the amount of water should be **no greater than** a 1:9 ratio with the other components. The Examiner asserts that Mallek teaches a weight ratio of 0.3:1, or 1:3.33. In order to arrive at the Mallek ratio, one of ordinary skill would have to have some reason to **increase** the amount of water in the Roy matrix from a maximum of 1:9. But Roy teaches the opposite–that the amount of water should be **limited**. By the Examiner's own characterization of Roy, one of skill would have had absolutely no reason to increase the amount water in the cement matrix to arrive at the amount disclosed in Mallek, and in fact, **would have been motivated to decrease** the amount of water to the lowest amount taught by Roy, which is 1:21.[2] Thus, based on the Examiner's characterization of the references, Roy teaches away from arriving at the amount of water disclosed by Mallek, and one of ordinary skill would have had no motivation to combine the teachings of these references. In view of the foregoing, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of claims 26 and 27 under 35 U.S.C. § 103(a) over Roy in view of Mallek.

[2] Based on the approximate weight ratios of (aggregate):(sand):(cement):(water) of (10):(5 to 7):(3 to 4):(1 to 2) taught by Roy, the lowest amount of water would be 1 part as compared to the sum of 10, 7, and 4 parts of the other components, or 1:21.

3. Conclusion

Applicant respectfully submits that the instant application is in good and proper order for allowance and early notification to this effect is solicited. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the instant application, the Examiner is encouraged to call the undersigned at the number listed below.

Respectfully submitted,

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Dated: October 9, 2009

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